

Notice of Allowability

Application No.

10/087,360

Examiner

Thanh-Ha Dang

Applicant(s)

CHA ET AL.

Art Unit

2163

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 05/07/07.
2. ☒ The allowed claim(s) is/are 1-16.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

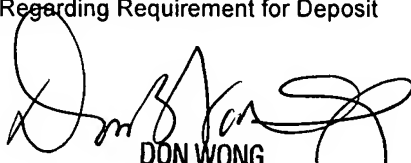
* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☒ Interview Summary (PTO-413),
Paper No./Mail Date 052307.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____


DON WONG
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100

DETAILED ACTION

Response to Amendment

1. Receipt of Applicant's Amendment filed 05/07/07 is acknowledged.

EXAMINER'S AMENDMENT

2. Authorization for this examiner's amendment was given in a telephone interview with Mr. Andre L. Marais (RN 48,095) on 05/23/07.

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

The application has been amended as follows:

1. (Currently Amended) A method of accessing a multi-dimensional index structure resident in main memory for facilitating reference to data objects stored in a database, wherein the index structure consists of internal nodes having pointers to child nodes and leaf nodes having to database objects, the method comprising:

associating with each node a minimum bounding rectangle ("MBR"), wherein each MBR is a minimal hyper-rectangle enclosing a corresponding data object in the case of a leaf node and all hyper-rectangles in the child node in the case of an internal node;

representing each of one or more said MBRs by a relative representation of an MBR ("RMBR"), wherein the relative representation of an MBR ("RMBR") that is coordinates of the MBR represented relative to coordinates of a reference MBR; and

compressing each RMBR[[s]] into a quantized[[.]] RMBR ("QRMBR") by quantizing each RMBR to using a given finite precision level of quantization, wherein the compressing includes by cutting off trailing insignificant bits of the RMBR after quantization[[.]]; and

accessing the data objects stored in the database as a function of the QRMBR.

2. (Original) The method of claim 1, wherein said multi-dimensional index structure is an R-tree.
3. (Original) The method of claim 1, wherein said multi-dimensional index structure is an R*-tree.
4. (Original) The method of claim 1, wherein said multi-dimensional index structure is an R+-tree.
5. (Original) The method of claim 1, wherein said multi-dimensional index structure is a Hilbert R-tree.

6. (Previously Presented) The method of claim 1, wherein each internal node has a plurality of entries and wherein a first entry has a QRMBR and a pointer while the rest of the entries have only QRMBRs.
7. (Original) The method of claim 1, wherein each node stores a reference MBR.
8. (Currently Amended) The method of claim 7, wherein the reference MBR of a node is obtained from ~~the~~ a corresponding QRMBR stored in the node's parent node.
9. (Original) The method of claim 1, wherein the internal nodes store QRMBRs while the leaf nodes store MBRs.
10. (Original) The method of claim 1, wherein said database resides in main memory.
11. (Original) The method of claim 1, wherein said database resides in disk.
12. (Currently Amended) A method of accessing a multi-dimensional index structure resident in main memory for facilitating reference to data objects stored

in a database, wherein the index structure consists of internal nodes having pointers to child nodes and leaf nodes having to database objects, the method comprising:

associating with each node a minimum bounding shape, a multi-dimensional shape enclosing a corresponding data object in the case of a leaf node and all minimum bounding shapes in the child node in the case of an internal node;

representing each of one or more said minimum bounding shapes by a relative representation, wherein the relative representation that is coordinates of [[a]] the minimum bounding shape represented relative to coordinates of a reference minimum bounding shape; and

compressing each relative representation into a quantized representation by quantizing each relative representation to using a given finite precision level of quantization, wherein the compressing includes by cutting off trailing insignificant bits of the relative representation after quantization~~[[.]]~~; and

accessing the data objects stored in the database as a function of the quantized representation to access.

13. (Previously Presented) The method of claim 12, wherein each internal node has a plurality of entries and wherein a first entry has a quantized representation and a pointer while the rest of the entries have only quantized representations.

14. (Previously Presented) The method of claim 12, wherein the reference minimum bounding shape of a node is obtained from a corresponding quantized representation stored in the node's parent node.

15. (Original) The method of claim 12, wherein said database resides in main memory.

16. (Original) The method of claim 12, wherein said database resides in disk.

17-32. (Canceled)

Allowable Subject Matter

3. Claims 1-16 are allowed.

The following is an examiner's statement of reasons for allowance: Claims 1-16 are allowable because the prior art made of record does not teach or fairly suggest the combination of elements as recited in independent Claims 1 and 12.

Specifically, the prior art of record does not teach:

- compressing each RMBR into a quantized RMBR ("QRMBR") by quantizing each RMBR using a given finite level of quantization, wherein the compressing includes cutting off trailing insignificant bits of the RMBR after quantization taken with the other limitations as recited in Claim 1.

- compressing each relative representation into a quantized representation by quantizing each relative representation using a given finite level of quantization, wherein the compressing includes cutting off trailing insignificant bits of the relative representation after quantization taken with the other limitations as recited in Claim 12.

The dependent claims being definite, further limiting and fully enabled by the Specification are also allowed.

These features, together with the other limitations of the independent claims are novel and non-obvious over the prior art of record.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

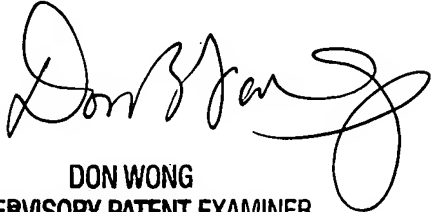
Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh-Ha Dang whose telephone number is 571-272-4033. The examiner can normally be reached on Monday-Friday from 9:00 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Don Wong can be reached on 571-272-1834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Thanh-Ha Dang
Examiner
Art Unit 2163


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